REMARKS

Claims 6, 8, 9, 12-23, and 27-30 are in this patent application for further consideration. Claims 6 and 20 have been amended to recite the fluorine treatment of the copolymer prior to mixing with the metal powder, which avoids reaction between fluorine and the metal powder (sentence bridging pp. 11-12). These claims have also been amended to recite the steel surface being rotolined (p. 6, l. 1-2). Claim 20 has been amended to recite the minimum peel strength for the adhesion of the rotolining to the steel interior surface of the hollow article being rotolined with the composition of this claim, as already recited in claim 6. Thus the adhesion capability recited in claims 6 and 20 are obtained without the presence of an intervening primer on the steel surface. Claim 8 has been amended to recite that the overcoating consists of the stabilized copolymer (p. 10, l. 18-19) so as to distinguish from the Rau et al. topcoat composition containing ceramic powder to prevent bubbling of the PFA. Claim 16 has been amended to recite the minimum thickness of the overcoat disclosed on p. 9, l. 21-26. Claim 19 has been amended to insert a period at the end of the claim.

Reconsideration of the rejection of Applicant's claims is respectfully requested in view of these amendments and the discussion to follow.

Reliance of the obviousness rejection on Buckmaster

The obviousness rejection of all of Applicant's claims relies on the importation into Kazumi of Buckmaster's disclosure of fluorine treatment of PFA to stabilize the copolymer to reduce bubbling during heat processing. The Office Action dated April 8, 2009 recites two motivations for this importation (i) to reduce bubbling in Kazumi and (ii) to provide a PFA that is easier to handle in the rotolining process of Kazumi. In the Amendment dated July 9, 2009, authorities were cited for the proposition that the combining of references to solve a problem already solved by one of the references was not an obvious combination to one skilled in the art (p. 8). This proposition applies to the present fact situation, i.e. it is not obvious to import the Buckmaster fluorine treatment solution to the PFA bubbling problem into Kazumi because Kazumi has already solved the bubbling problem by incorporation fine powder into the PFA. Apparently this reasoning has been adopted, because only motivation (ii) is recited in the latest Office Action.

Motivation (ii) does not suggest incorporating fluorine treatment into Kazumi because fluorine treatment is unrelated to the easier handling aspect of the Buckmaster teaching. Buckmaster discloses the preparation of PFA granules having good particle flow and thermal stability (col. 1, l. 7-11). The good particle flow is disclosed to come from the process for creating the granules and from heat hardening them. With respect to the treatment that creates the granules, Buckmaster discloses the following:

> "This treatment produces copolymer granules which are spherical in shape and are easily handled" (col. 2, l. 24-26)

With respect to heat hardening of the granules, Buckmaster discloses the following:

> "The hardening facilitates handling by reducing friability." (col. 2, l. 32-33)

Fluorine treatment is not involved in either the production of the granules or the heat hardening thereof. In this regard, Buckmaster discloses the following:

> "If the copolymers contain unstable ends, the granules can be subjected to an atmosphere containing fluorine to convert unstable end groups to stable fluorinated end groups, thereby reducing bubbling or evolution of volatiles during further end-use processing." (col. 2, l. 33-38)

Thus, according to Buckmaster, the easier handling aspect comes from the granule forming process and the heat hardening of the granules not from the fluorine treatment of the already formed granules. It is also apparent from the sequential nature of the granule forming, heat hardening, and fluorination steps that the fluorination step is separable from the granule-forming and heat hardening steps, whereby the latter can be practiced without subsequent fluorine treatment of the granules. Indeed Buckmaster's Examples I and II practice granule formation and heat hardening, but not fluorine treatment. Fluorine treatment is not a trivial operation. It involves the handling and use of fluorine, which is extremely corrosive a considerable amount of heating and reaction time (col. 4, l. 55-59). Since the easier handling beneficial effect of the Buckmaster granules does not require fluorine treatment, then the importation of this beneficial effect into Kazumi does not require importation of the subsequent fluorine treatment step as well. In view of the nature and cost of fluorine treatment and the fact that the bubbling problem has already been solved by Kazumi, then it would not be obvious to one skilled in the art to import the Buckmaster fluorine treatment into Kazumi to reduce bubbling. As noted above, the current rejection has already recognized that bubble reduction is not a motivation for importation of fluorine treatment into Kazumi.

Concerning the easier handling aspect of Buckmaster, this too is not obviously applicable to Kazumi. Kazumi refers to his fine powder simply as fine powder without any disclosure of powder characteristics or that it has a powder flow or friability problem. Kazumi does disclose, however, that the fine powder has free movement in the molten resin, which prevents bubbles from remaining in the resin [0017]. One skilled in the art, without knowledge of the present invention is not led to Buckmaster's heat hardened granules to solve a problem not disclosed or known to exist in Kazumi. Moreover, the heat hardening of the Buckmaster granules is not an invitation to fine powder free movement in the molten resin desired by Kazumi. Furthermore, the goal of the Buckmaster granule forming process is to forming granules that are low in metal contamination, because no thermal processing equipment is used to make the granules (col. 1, l. 48-49) and col. 39-42). It is inconsistent with this goal and therefore unobvious to import these granules into Kazumi if metal powder were to be used as the anti-bubbling agent.

Since the rejection of all the claims depends on Buckmaster for the conclusion of obviousness and since Buckmaster does not support that conclusion, then all of Applicant's claims are non-obvious over the prior art, without requiring consideration of the remainder of the Office Action. For the sake of completeness, the remainder of the Office Action will be addressed below, without repetition of the non-obviousness of the incorporation of Buckmaster into Kazumi.

<u>The Obviousness Rejection of Claims 6, 12, 14-15, 17-18, 19-23, and 25-27 Based on Kazumi in view of Buckmaster</u>

With respect to claim 6, the rejection (p. 2) notes that Kazumi does not teach that the PFA is fluorine treatment stabilized as though this was the only difference from Applicant's invention. A fundamental difference between Applicant's invention and Kazumi is that there is no disclosure or suggestion in Kazumi (1) that any of the fine powders disclosed have any effect on the non-adhesion of the PFA by itself to the rotolining substrate and (2) of the combination of certain metal powders and their small amounts that produce the high peel strength recited in claim 6.

The rejection (p. 3) cites authorities for the propositions that the relationship between Applicant's claimed amount of metal powder, 0.3 to 2 wt%, and the Kazumi disclosed amount of fine powder, 0.1 to 30 wt%, presents a case of prima facia obviousness and that Applicant's claimed amount of metal powder is mere optimizing. That Applicant's small amount of certain metal powder provides a different result from the Kazumi disclosed result for fine powder is neither obvious nor an exercise in optimizing.

The rejection (p. 3) asserts that it would have been obvious to have selected and/or optimized the amount of metal powder in order to increase its usefulness. The discovery of the present invention that certain metal powders in small amounts provide a highly adherent rotolining is not an increase in usefulness of these metal powders. It is a complete change in usefulness, which is not suggested by Kazumi.

The rejection (p. 3) admits that the combination of Kazumi with Buckmaster does not teach the adhesion recited in Applicant's claims but makes two observations justifying the obviousness rejection: (a) Kazumi's additives are the same as Applicant's and in the same proportion and (b) Kazumi discloses a desire to create an adherent lining. Observation (a) is an inherency argument, which will be addressed after addressing observation (b).

With respect to observation (b), the expression "adhered" is disclosed in Kazumi with respect to the insertion of a bag of a synthetic resin into the interior of a container [0002] and [0003]. The identity of the synthetic resin is not disclosed. Moreover, the relationship between the bag of unidentified synthetic resin not adhering to the container and the obviousness rejection is not explained in the rejection. If it means that this is evidence of desire, there is no evidence in Kazumi of an effort to satisfy this desire. Instead, under

"**Problems to be solved by the invention**" Kazumi discloses the addition of fine powders to the PFA to suppress bubbling [0007] and the suppression of this fine powder from precipitating from the surface of the resin layer [0009]. One skilled in the art does not foresee from the Kazumi disclosure of non-adherence of a bag of unidentified synthetic resin that Kazumi was solving the wrong problem under "**Problems to be solved by the invention"** and that solution to the bag adherence problem was to be found in the Kazumi solution to the bubbling/precipitation problems.

When the rotolining polymer is PFA, one skilled in the art knows that the rotolining of this polymer has no meaningful adhesion to a surface to be rotolined. This is reported in Scheirs as disclosed in the bottom paragraph on p. 1 of the specification and is demonstrated in Example 1 in the present specification (p. 14, l. 24-27), wherein it is disclosed that the rotolining formed solely from the fluorine-stabilized TFE/PAVE copolymer is bubble-free but separates from the grit-blasted steel surface upon cooling of the mold and test panels therein. Nishio et al. (Nishio) discloses obtaining a bubble-free rotolining by high-speed rotation of the mold to apply centrifugal force to the melting PFA, which is disclosed to cause adhesion to the surface to be lined (col. 2, l. 8-22). The use of filler, especially glass fiber, in the PFA to reduce the thermal shrinkage of the PFA is encouraged (col. 3, l. 1-10) as is the use of primer on the surface to be rotolined (col. 3, l. 51-55). The amount of glass fiber filler used in the PFA in Examples 1-7 is 25 wt% (col. 4, l. 41-42 and col. 3, l. 65-67). The lining for Examples 8-11 use filler-free PFA. All these lining are evaluated by resistance to bubble formation, surface smoothness and the filler free lining by physical properties and not by adhesion. It is only Example 12 that comments on adhesion of the lining to the substrate, namely that the "lined film did not peel" (col. 6. l. 53). In this example 12, the surface to be rotolined is precoated with a primer (col.6, l. 24-26). The use of the term "adhered" in Nishio is understood by one skilled in the art as the PFA needing help to provide meaningful adhesion to the surface to be rotolined, e.g. either a large amount of thermal shrinkage reducing filler or an intervening primer or both as in Example 12. Rau et a. (Rau) discloses that it is relatively difficult to achieve bonding a straight PFA resin to metal substrates, but the addition of polyphenylene sulfide (PPS) or ceramic powder to the PFA provides adhesion (col. 20, l. 5-20). The PFA Examples in Rau use a primed substrate, wherein the primer is variously disclosed as PFA/PPS resin or TEFLON®-P 532-5012 PFA resin as the primer resin (col. 17, l. -18). TEFLON®–P 532-5012 is PFA/PPS resin. Even these primers do not provide a high degree of adhesion as shown Table 24 in col. 32 of Rau, wherein the bond strength of the PFA by itself, and of PFA+SiC, and PFA+PPS compositions are reported to low and indistinguishable from one another, and that it takes polyetheretherketone (PEEK) as the additive (15 wt%) to provide high bond strength. From the foregoing, one skilled in the art knows that PFA needs help in order to obtain high adhesion to steel, and that the disclosure

in Kazumi of the inserted bag of synthetic resin not being adhered to the container provides neither any hint for solving this problem or of Applicant's solution to this problem.

With respect to (a), p. 6 of the rejection asserts the inherency of the adhesion effect of Applicant's invention without ever defining the legal requirement for inherency to exist. That inherency may arise both in the context of anticipation and obviousness provides no definition of inherency. The rejection also refers to MPEP § 2112. That section provides the definition, as follows:

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." (MPEP § 2112-IV)

This section of the MPEP cites In re Oelrich, 212 USPQ 323, 326 (CCPA 1981) for the proposition that the inherency must be necessary, and In re Robertson, 49 USPQ2d 1949, 1950-51 for the proposition that "may occur" is not sufficient for a conclusion of inherency. The citation of In re Rijckaert, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) in this MPEP section seems particularly relevant in its conclusion that an assertion of optimization does not satisfy the requirement that the result or characteristic is necessarily present in the prior art.

The factual basis for the assertion of inherency is expressed in the rejection as Kazumi's additives being the same type as used by applicant and in the same amount (p. 3) and the combination of Kazumi and Buckmaster teach all the elements of applicant's invention (p. 6). Buckmaster does not contribute to inherency, because PFA has no meaningful adhesion to the surface to be rotolined. If inherency were to exist, the peel strength would have to be a necessary result of the practice of Kazumi teaching. That the teaching of Kazumi does not necessarily lead to Applicant's adhesion result is seen from the following:

A. The adhesion required by claim 6 is a strong adhesion as indicated by the minimum peel strength of 25 lb/in recited in this claim.

B. It is only a very small amount of metal powder that itself is not bubble promoting that is present in the fluorine treatment stabilized TFE/PAVE copolymer of claim 6. This small amount is no greater than 2 wt%. Applicant's Examples show the effect of metal powder concentration on adhesion. Example 3 discloses the highest peel strength (42.6 lb/in) to occur at 0.8 wt% metal powder over a range of 0.5 wt% (43.4 lb/in) to 1.1 wt% (37.2 lb/in). Example 4 discloses similar peel strength results for the composition containing 0.5 wt% Zn, Sn, or Cu. Example 5 discloses that the peel strength of the stabilized PFA composition on

stainless steel falls from 41.5 lb/in at 0.5 wt% metal content to 28.35 lb/in at 1.0 wt% metal content.

C. The claim requirement that the metal powder does not cause bubble formation distinguishes acceptable metal powder and unacceptable metal powder in the small amounts recited in claim 6. Al powder is an unacceptable metal powder because it causes bubbling. In this regard, Example 4 (p. 16, l. 6-10) discloses that 0.5 and 1.0 wt% Al powder in the composition causes bubble formation in the rotolining.

In contrast to the narrow compositional range and specificity for certain metal powders to obtain the high peel strength according to the present invention, Kazumi contains a much broader teaching aimed at the different effect, bubble prevention. Thus, Kazumi discloses two categories of fine powder to achieve bubble prevention, inorganic powder and metal powder, and the specific fine powders disclosed are glass, silicon, zinc, aluminum, copper, etc. [0007]. The amount of fine powder disclosed in Kazumi is 0.1 to 30 wt%, with 5 wt% being most effective for removing bubbles [0018].

There is no guidance in Kazumi towards the combination of which fine powder at a concentration of less than 2 wt% would provide the high peel strength required by claim 6. One skilled in the art, without knowledge of the present invention, is not led to using less than 2 wt% fine powder, and when doing so, using the metal powder, not the inorganic powder, and if using the metal powder in such small amounts, using one which does not cause bubbling as does Al. It should therefore be apparent that Applicant's high peel strength is not necessarily inherent from the Kazumi disclosure. Further detracting from inherency is the non-obviousness of importing the Buckmaster fluorine treatment stabilization of the PFA as discussed above.

Claims 12, 14, 15, 17, 18 are unobvious and therefore patentable on the same basis as parent claim 6. Claim 19 is additionally unobvious by virtue of the very small amount and narrow range of the metal powders (0.3 to 1.2 wt%) recited in this claim. Kazumi neither suggests nor renders inherent the combination of these metal powders and this small amount (range) to obtain the minimum peel strength of 25 lb/in recited in claim 19.

Claim 20 is unobvious and therefore patentable on the same basis as claim 6. Claims 21, 23, and 27 are patentable on the same basis as claim 20. Claim 22 is additionally unobvious and therefore patentable on the same basis as claim 19.

<u>The Obviousness Rejection of claims 8 and 16 over Kazumi/Buckmaster in the light of Nishio and Rau</u>

No explanation of the reliance on Rau for this rejection is given in the rejection.

With respect to claim 8, Nishio is relied upon for its disclosure of producing a bubble-free rotolining having a filler-free overcoat that is obviously applicable to Kazumi/Buckmaster. Since Kazumi already discloses a PFA overcoat that contains no filler [0020], the need for Nishio to complete the rejection of this claim relevance is not understood. Nishio is also consistent with Kazumi in forming a thinner overcoat than the thickness of the rotolining as is seen from Nishio's Example 12, using 100 g of filler-free overcoat on top of a rotolining formed from 200 g of filler-loaded PFA. One skilled in the art knows that use of half the amount of polymer as an overcoat provides an overcoat that is one-half the thickness of the undercoat.

Claim 8 recites the stabilized PFA as being present in both the rotolining applied to the steel substrate and to the overcoat. Kazumi has no disclosure of fluorine treatment stabilization of PFA of either its first layer or its second layer. Buckmaster has no disclosure of applicability to an overcoat for a rotolining. In the absence of knowledge of the present invention, this combination of references does not suggest the subject matter of claim 8.

With respect to claim 16, Buckmaster is cited against the overcoat recited in this claim by virtue of the Buckmaster disclosure of TFE/PMVE and TFE/PPVE copolymers and the $–CF_2H$ end group, the rejection asserting that the use of the TFE/PMVE/PPVE copolymer as the overcoat would be predictably successful because of the recognized use for this application. In response, Kazumi cautions about the thickness of his overcoat so as to avoid bubbling of the overcoat [0022], and discloses that the overcoat thickness of 0.5 to 1 mm is desirable in this regard [0023]. Claim 16 has been amended to recite the greater minimum thickness of 1.3 mm for the overcoat. Kazumi does not suggest this greater overcoat thickness. Neither does Buckmaster, which has no disclosure of rotolining overcoat for any copolymer disclosed in Buckmaster.

A bubble-free success for such a thick overcoat from the TFE/PMVE/PPVE copolymer of claim 16 is not predictable from either Kazumi or Buckmaster. While Buckmaster discloses the $–CF_2H$ as an exception to the thermally/hydrolytically unstable end groups (col. 4, l. 36-38) , Buckmaster is not satisfied with the $-CF_2H$ end group for rotolining to obtain a bubble free lining, which is why Buckmaster exposes the PFA granules to fluorine to obtain the $–CF_3$ end groups (col. 4, l. 67-68).

The rejection also considers that the TFE/PMVE/PPVE copolymer is a known copolymer based on the Buckmaster disclosures of TFE/PMVE copolymer and TFE/PPVE copolymer. As discussed in Scheirs, cited on p. 6, first full paragraph of the Amendment dated July 9, 2009, TFE/PMVE/PPVE copolymer is a known copolymer, called MFA, to distinguish from PFA. The PMVE and PPVE components of MFA are not a physical mixture, but instead combine with TFE via copolymerization to form a polymer. The use of MFA

having –CF_2H end groups to form an overcoat which is at least 1.3 mm thick is neither known nor suggested by Kazumi/Buckmaster.

<u>The obviousness rejection of claims 9 and 28-30 based on Kazumi/Buckmaster/Nishio in view of Rau</u>

With respect to claim 9, this claim recites the minimum overcoat thickness of 2.5 mm wherein the overcoat is of the stabilized fluoropolymer. This claim is unobvious over these references on the same basis as claim 8, with the additional bases being the much greater thickness of the overcoat as compared to Kazumi, Nishio not disclosing any thickness for the overcoat, while suggesting that it be one-half the thickness of the undercoat (Nishio Example 12), and Buckmaster not disclosing any overcoat.

The rejection cites Rau as disclosing a barrier layer thickness of at least 0.040 in (col. 15, l. 61-68). This thickness, while open-ended, corresponds to 1 mm, which is much less than the minimum overcoat thickness of 2.5 mm recited in claim 9. At the thickness rate of 0.006 to 0.01 in per spray application (col. 15, l. 53-54), followed by heat soaking of each layer (col. 15, l. 57-62) disclosed in Rau it would require at least 10 spray/heat soaking steps to arrive at the minimum thickness of 2.5 mm of claim 9. Rau does not suggest such an onerous overcoating process as would be required to reach the 2.5 mm overcoat thickness. Moreover the barrier layer in Rau is the PFA/SiC composition disclosed as the topcoat composition at col. 15, l. 40. The barrier layers (topcoats) of Rau contain an inorganic (ceramic) material (col. 6, l. 63-67, and col. col. 11, l. 10-16) to prevent the fluoropolymer (PFA) from bubbling (col. 20, l. 23-68). By virtue of claim 8 reciting that the overcoat <u>consists of</u> the stabilized PFA, the dependent claim 9 excludes the presence of the Rau ceramic powder to prevent bubbling. The admonition against a thick overcoat layer in Kazumi to avoid bubbles and the requirement of Rau for the presence of ceramic powder in the overcoat layer to avoid bubbles leads away from the thick layer of claim 9, wherein no ceramic powder can be present.

Claims 28-30 are unobvious on the same basis as claims 8 and 9 and based on the additional subject matter recited in these claims.

The 4 mm minimum overcoat thickness of claim 28 is much greater than the 0.5 to 1.0 mm thick overcoat (second layer) thickness favored in Kazumi in order to avoid bubbles in the PFA. The Rau topcoating method 0.006 to 0.010 in/coat, followed by heat soak after each coat, would require at least 16 coat/heat soak steps in order to arrive at the 4 mm thickness of claim 28. One skilled in the art, without knowledge of the present invention, would not read such an onerous overcoating process into the Rau disclosure in order to form a 4 mm thick topcoat (containing no ceramic powder).

With respect to claim 29, the overcoats of both Kazumi and Nishio (Example 12) are less than the thickness of the undercoat, which thereby lead away from the opposite

relationship recited in this claim. Rau is not relevant to claim 29 by virtue of its exclusion of the Rau ceramic powder from the overcoat.

With respect to claim 30, the minimum 1.5 mm thickness for the stabilized PFA overcoat recited in this claim is at least 50% greater than the Kazumi overcoat (second layer) thickness. The Kazumi overcoat is kept thin to avoid bubbles. This same limitation would apply to any understanding of the overcoat thickness intended in Nishio. Buckmaster of course has no teaching related to overcoat, and Rau requires ceramic powder in his topcoat in order to avoid bubbles. Without knowledge of the present invention, one skilled in the art does not foresee the overcoat composition and thickness recited in claim 30.

<u>The obviousness rejection of claim 13 over Kazumi/Buckmaster in view of Saito et al. (Saito)</u>

Claim 13 is unobvious and therefore patentable on the same basis as claim 6 as discussed above.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

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